

Abstract

A video camera with an adaptive optic device, digital images, and a sequential diversity processor can reduce the optical aberrations introduced by a changing optical medium so as to produce sharper clarified images. The change in the optics between sequential video frames is diversity information which allows the sequential diversity processor to estimate both the object under observation and the aberration. No additional information, such as a defocused image or other sensing device, is required. The concept could be used in any video camera which outputs digital images and uses a digital processor to control the adaptive optic device between sequential frames.

Diversity imaging uses two or more diverse images, usually measured simultaneously, to sharpen the image in a camera with adaptive optics. This invention shows how sequential changes in the optics can provide the diverse images. No additional equipment is needed, which greatly simplifies diversity imaging. For example, in a commercial video camera automatic focus provides phase diversity; the present invention shows how such a camera can produce sharper images.